



## General

### Guideline Title

British Thoracic Society guideline on pulmonary rehabilitation in adults.

### Bibliographic Source(s)

Bolton CE, Bevan-Smith EF, Blakey JD, Crowe P, Elkin SL, Garrod R, Greening NJ, Heslop K, Hull JH, Man WD, Morgan MD, Proud D, Roberts CM, Sewell L, Singh SJ, Walker PP, Walmsley S, British Thoracic Society Pulmonary Rehabilitation Guideline Development Group, British Thoracic Society Standards of Care Committee. British Thoracic Society guideline on pulmonary rehabilitation in adults. *Thorax*. 2013 Sep;68(Suppl 2):ii1-30. [211 references] [PubMed](#)

### Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

## Recommendations

### Major Recommendations

The levels of evidence (1++, 1+, 1-, 2++, 2+, 2-, 3, 4), grades of recommendations (A-D), and good practice points (GPPs) are defined at the end of the "Major Recommendations" field.

#### The Role of Pulmonary Rehabilitation

- Pulmonary rehabilitation should be offered to patients with chronic obstructive pulmonary disease (COPD) with a view to improving exercise capacity by a clinically important amount. [A]
- Pulmonary rehabilitation should be offered to patients with COPD with a view to improving dyspnoea and health status by a clinically important amount. [A]
- Different components within a pulmonary rehabilitation programme, such as resistance training, can influence quadriceps strength and this is addressed in the section 'Nature of Training' below. [GPP]
- Pulmonary rehabilitation should be offered to patients with COPD with a view to improving psychological well-being. [A]
- As a minimum, efficacy of pulmonary rehabilitation programmes needs to be regularly assessed by demonstrating clinically important improvements in exercise capacity, dyspnoea, and health status. [B]
- As part of regular assessment, patient satisfaction and feedback should be sought. [GPP]

#### Referral and Assessment of Patients for Pulmonary Rehabilitation

- The point of referral to pulmonary rehabilitation should be used as an opportunity to explore the patient's understanding of pulmonary rehabilitation, address concerns, and to educate patients about the benefits of a pulmonary rehabilitation programme. [GPP]
- Healthcare professionals making referrals to pulmonary rehabilitation should have basic knowledge about what a programme entails and effectiveness. A pulmonary rehabilitation programme should be presented by the referrer as a fundamental treatment for COPD rather than an optional extra. [GPP]
- Initial assessment for pulmonary rehabilitation provides an opportunity to assess and refer for treatment of comorbidities prior to commencing. [GPP]
- The setting of pulmonary rehabilitation, skill mix of the team, and other comorbidities should always be considered in the risk assessment of patients entering a rehabilitation programme. [GPP]

## Specific Situations at Assessment

### *Smoking*

- Patients with COPD should be referred for pulmonary rehabilitation regardless of their smoking status. [D]
- Patients referred to pulmonary rehabilitation should have their smoking status assessed and referral to smoking cessation services offered to smokers simultaneously. [GPP]
- Pulmonary rehabilitation provides opportunities to offer smoking cessation advice. [GPP]

### *Chronic Respiratory Failure*

- Patients with COPD can be referred for pulmonary rehabilitation regardless of whether or not they have chronic respiratory failure. [D]
- When considering the referral of patients with chronic respiratory failure, practitioners should reflect on the receiving setting and skill mix of the attending staff to provide safe pulmonary rehabilitation to these patients who have significant physiological impairment and potential for greater instability by the intended programme. [GPP]

### *Cardiovascular Disease Comorbidity*

- People with chronic respiratory disease should be referred to pulmonary rehabilitation irrespective of coexistent stable cardiovascular disease. [D]
- A coexistent abdominal aortic aneurysm (AAA) <5.5 cm should not preclude referral to pulmonary rehabilitation and being included in moderate intensity aerobic exercise training, provided blood pressure is controlled. [D]
- The referral process and/or the initial assessment for pulmonary rehabilitation offer an important opportunity to assess and optimise cardiovascular health and address risk factors for cardiovascular disease. [GPP]
- In patients with COPD who have an AAA >5.5 cm, deemed not fit for surgery, pulmonary rehabilitation incorporating mild–moderate intensity aerobic exercise may be considered, but should not include resistance training. [GPP]

### *Anxiety and Depression*

- Coexistent symptoms of anxiety and/or depression in patients with COPD should not preclude referral to pulmonary rehabilitation. [D]
- The referral process and the assessments for pulmonary rehabilitation offer important opportunities to detect and consider referral for ongoing support and management for depression. [GPP]

### *Medical Research Council (MRC) Dyspnoea Scale*

- Patients with an MRC dyspnoea score of 3–5 who are functionally limited by breathlessness should be referred for outpatient pulmonary rehabilitation. [A]
- Patients with a MRC dyspnoea score of 2 who are functionally limited by breathlessness should be referred for pulmonary rehabilitation. [D]
- Patients with a MRC dyspnoea score of 5 who are housebound should not routinely be offered supervised pulmonary rehabilitation within their home. [B]
- Flexible and pragmatic approaches should be considered to facilitate exercise training in patients who have less severe COPD and who are less breathless. [GPP]

### *Bronchodilator Therapy*

- Patients with COPD should be taking bronchodilator therapy in line with National Institute for Health and Care Excellence (NICE) COPD guidelines prior to referral to pulmonary rehabilitation. [D]
- Pulmonary rehabilitation offers an opportunity to check and optimise inhaler technique. [GPP]

## *Other Considerations Regarding Referral to Pulmonary Rehabilitation*

- Patients with unstable cardiac disease or locomotor difficulties that preclude exercise (e.g., severe arthritis or severe peripheral vascular disease) should not be referred for pulmonary rehabilitation. [GPP]
- Careful consideration should be given to patients who have significant cognitive or psychiatric impairment that would lead to an inability to follow simple commands in a group setting. [GPP]
- In certain individual cases, facilitation of pulmonary rehabilitation may be aided by the support and attendance of a relative or carer. [GPP]
- In case of doubt over the appropriateness of a patient for pulmonary rehabilitation, clinicians are advised to contact their local provider. [GPP]

## Structure of Pulmonary Rehabilitation

### Frequency of Supervised Pulmonary Rehabilitation Sessions

- Pulmonary rehabilitation programmes should be a minimum of twice-weekly supervised sessions. [D]
- In line with published pulmonary rehabilitation studies and the outcomes they demonstrate, a third session of prescribed exercise is recommended. This can be performed unsupervised. [GPP]
- Encouragement of regular physical activity 5 times a week for 30 min each time is encouraged in line with standard healthy living advice. [GPP]

### Duration of Pulmonary Rehabilitation Programmes

- Pulmonary rehabilitation programmes of 6 to 12 weeks are recommended. [A]
- Pulmonary rehabilitation programmes including the attendance at a minimum of 12 supervised sessions are recommended, although individual patients can gain some benefit from fewer sessions. [A]
- If training for less than 6 weeks is considered, this should be individualised and objective/subjective measures of benefit in place before patients graduate. For some individuals, reassessment at 4 weeks and graduation to independent gym training is a feasible possibility. [GPP]

### Rolling or Cohort Programmes

- Cohort or rolling programmes of pulmonary rehabilitation are both acceptable forms of delivery depending on local considerations. [D]

### Nature of Training

- To ensure strength and endurance benefits in patients with COPD, a combination of progressive muscle resistance and aerobic training should be delivered during a pulmonary rehabilitation programme. [B]
- Relevant expertise is required to deliver resistance training. [GPP]
- Patients should be capable of continuing effective resistance training once supervised sessions have ended. The supervising rehabilitation therapist should ensure that patients are able and willing to continue with unsupervised resistance training. [GPP]
- Prescribing of progressive strength exercise should be individualised for each patient, taking into consideration the initial health screening and any increase in risk from comorbidities. [GPP]

### Interval and Continuous Aerobic Training

- Interval and continuous training can be applied safely and effectively within the context of pulmonary rehabilitation to patients with COPD. [A]
- The choice of interval or continuous training will be down to the patient and/or therapist preference. [GPP]
- In clinical practice, interval training may require a higher therapist to patient ratio to ensure adequate work rate and rest intervals are achieved compared with continuous training. [GPP]

### Goal Setting in Pulmonary Rehabilitation

- Generic exercise training as opposed to individually targeted exercise training is recommended for pulmonary rehabilitation. [D]
- While generic exercise training is recommended as opposed to an individually targeted exercise programme, the prescription of exercise is individualised to provide correct intensity. [GPP]
- Besides the exercise elements of pulmonary rehabilitation, healthcare professionals commonly use goal setting to address specific hurdles. Given the personalised nature of this intervention to a patient's needs, evidence is difficult to quantify. [GPP]
- The term "goal setting" may require discussion with the patient. [GPP]

## Supervision in Pulmonary Rehabilitation

- A supervised pulmonary rehabilitation programme is recommended for patients with COPD. [A]
- If considering a structured home-based rehabilitation programme for patients with COPD, the following important factors need careful consideration: mechanisms to offer remote support and/or supervision, provision of home exercise equipment, and patient selection. [B]
- There would be some benefit to increasing the options for pulmonary rehabilitation available to individuals with COPD, and increase the scope of the service. Geography may limit or stimulate options. [GPP]

## Post-exacerbation Pulmonary Rehabilitation

### Outcomes in Post-exacerbation Pulmonary Rehabilitation

- Patients hospitalised for acute exacerbation of COPD should be offered pulmonary rehabilitation at hospital discharge to commence within 1 month of discharge. [A]
- Providing post-exacerbation pulmonary rehabilitation alongside elective pulmonary rehabilitation courses can cause practical issues. Evaluation of innovative ways of delivering a combination of both modes of pulmonary rehabilitation in tandem would be useful. [GPP]

### Completion of Post-exacerbation Pulmonary Rehabilitation

- Clinical services providing post-exacerbation pulmonary rehabilitation commencing within 1 month of hospital discharge should carefully record uptake, adherence, and completion rates. [D]
- Patients who initially decline pulmonary rehabilitation commencing within 1 month of hospital discharge should be offered elective pulmonary rehabilitation. [D]

## Adjuncts to Pulmonary Rehabilitation

### Inspiratory Muscle Training (IMT) and Pulmonary Rehabilitation

- IMT is not recommended as a routine adjunct to pulmonary rehabilitation. [B]

### Hormones and Nutritional Supplements and Pulmonary Rehabilitation

- No specific hormonal or nutritional supplement can currently be recommended as a routine adjunct to pulmonary rehabilitation. [B]
- The optimal approaches for addressing malnutrition, sarcopenia, or obesity in COPD are uncertain and this is a wider issue than this guideline covers. However, attendance at a pulmonary rehabilitation course presents an ideal opportunity to screen and educate patients on nutrition. [GPP]
- Patients with a body mass index (BMI) in the underweight or obese range should be considered for specific dietetic support. [GPP]

### Non-invasive Ventilation (NIV) during Pulmonary Rehabilitation

- Long-term domiciliary NIV should not be provided for the sole purpose of improving outcomes during pulmonary rehabilitation. [D]
- Patients who already receive long-term domiciliary NIV for chronic respiratory failure should be offered the opportunity to exercise with NIV during pulmonary rehabilitation if acceptable and tolerable to the patient. [D]

### Supplemental Oxygen in Patients Undergoing Rehabilitation

- Supplemental oxygen should not be routinely used for all patients undergoing pulmonary rehabilitation. [B]
- Supplemental oxygen during pulmonary rehabilitation should be offered to those who fulfil the assessment criteria for long-term or ambulatory oxygen unless there are compelling clinical reasons to use alternative criteria. [D]
- Individuals who are prescribed oxygen but decline to use it during exercise should have this clearly documented in their notes. [GPP]
- Pulmonary rehabilitation provides an opportunity to assess the adequacy of the prescribed flow rate for patients already in receipt of long-term oxygen therapy or ambulatory oxygen. [GPP]

### Supplemental Heliox in Patients Undergoing Rehabilitation

- Heliox should not be used as an adjunct to pulmonary rehabilitation unless there are comorbidities which require its administration. [D]

### Neuromuscular Electrical Stimulation (NMES) and Pulmonary Rehabilitation

- If expertise in NEMS is available, selected patients (low BMI with evidence of quadriceps weakness) who are unable or unwilling to participate in pulmonary rehabilitation could be considered for NMES. [D]

## Pulmonary Rehabilitation in People with Other Chronic Respiratory Diseases

### Non-cystic Fibrosis (CF) Bronchiectasis

- Patients with non-CF bronchiectasis who have breathlessness affecting their activities of daily living (ADLs) should have access to and be considered for pulmonary rehabilitation. [D]
- Unlike in patients with CF, in patients with COPD and non-CF bronchiectasis with multidrug-resistant organisms, for example *Pseudomonas aeruginosa*, there is no current evidence of cross infection. [GPP]

### Interstitial Lung Diseases (ILDs)

- The benefits of exercise and the recommendation of incorporating exercise activities into a healthy lifestyle should be discussed with all patients with ILD. Such discussion needs to be tailored to realistic achievability for that person's condition. [GPP]
- If healthcare professionals consider referring certain patients with stable ILD who are limited by breathlessness in ADLs to pulmonary rehabilitation, they should discuss with the patient the likely benefits. [GPP]
- Patients with idiopathic pulmonary fibrosis have a potential for significant desaturation during exercise related activities. [GPP]

### Asthma

- The routine referral of patients with asthma to pulmonary rehabilitation is not recommended. [D]
- The benefits of exercise and the recommendation of incorporating exercise activities into a healthy lifestyle should be discussed with all patients with asthma. [GPP]
- If healthcare professionals consider referring certain patients with stable asthma who are limited by breathlessness in ADLs to pulmonary rehabilitation when on optimal therapy, they should discuss with the patient the likely benefits. [GPP]
- The British Thoracic Society (BTS)/Scottish Intercollegiate Guidelines Network (SIGN) asthma guideline draws attention to exercise-induced asthma and precautions to prevent this should be followed if appropriate. [GPP]

### Other Chronic Respiratory Diseases—in General

- Minimal clinically important different (MCID) changes and tools used to assess exercise capacity and quality of life for pulmonary rehabilitation in COPD are not necessarily transferable to other chronic respiratory diseases. While future research should address this, failure of rehabilitation should not be implied if failure to reach the COPD MCID for outcomes. [GPP]
- The educational element of pulmonary rehabilitation should be adapted for other chronic respiratory diseases if appropriate. [GPP]
- Practically, inclusion of patients with other chronic respiratory diseases into pulmonary rehabilitation will be alongside subjects with COPD. [GPP]
- General exercise should be encouraged for all patients with chronic respiratory disease. [GPP]

## Post Pulmonary Rehabilitation

### Repeat Pulmonary Rehabilitation Programmes

- Repeat pulmonary rehabilitation should be considered in patients who have completed a course of pulmonary rehabilitation more than 1 year previously. The likely benefits should be discussed and willing patients referred. [B]
- Earlier repeat pulmonary rehabilitation should be considered in individuals with accelerated physiological decline or if additional benefits on a shorter timescale would be clinically valuable. [D]
- It is unlikely that if the patient completed the pulmonary rehabilitation course originally and failed to gain a benefit, they would benefit a second time round, unless circumstances such as an exacerbation interrupted the initial programme. [GPP]

### Maintenance

- All patients completing pulmonary rehabilitation should be encouraged to continue to exercise beyond the programme. [A]
- Patients graduating from a pulmonary rehabilitation programme should be provided with opportunities for physical exercise beyond their rehabilitation programme. [GPP]

## Definitions:

### Key to Evidence Statements

Grade	Evidence
1++	High-quality meta-analyses, systematic reviews of randomised controlled trials (RCTs) or RCTs with a very low risk of bias
1+	Well conducted meta-analyses, systematic reviews of RCTs or RCTs with a low risk of bias
1-	Meta-analyses, systematic reviews or RCTs or RCTs with a high risk of bias
2++	High-quality systematic reviews of case-control or cohort studies or high-quality case-control or cohort studies with a very low risk of confounding, bias or chance, and a high probability that the relationship is causal
2+	Well conducted case-control or cohort studies with a low risk of confounding, bias or chance, and a moderate probability that the relationship is causal
2-	Case-control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal
3	Non-analytic studies, for example, case reports, case series
4	Expert opinion

#### Grades of Recommendations

Grade	Type of Evidence
A	At least one meta-analysis, systematic review, or randomised controlled trial (RCT) rated as 1++ and directly applicable to the target population <i>or</i>  A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+ directly applicable to the target
B	A body of evidence including studies rated as 2++ directly applicable to the target population and demonstrating overall consistency of results <i>or</i>  Extrapolated evidence from studies rated as 1++ or 1+
C	A body of evidence including studies rated as 2+ directly applicable to the target population and demonstrating overall consistency of results <i>or</i>  Extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4 <i>or</i>  Extrapolated evidence from studies rated as 2+
GPP (Good Practice Point)	Important practical points for which there is no research evidence, nor is there likely to be any research evidence. The Guideline Committee wishes to emphasise these as Good Practice Points

#### Clinical Algorithm(s)

None provided

#### Scope

#### Disease/Condition(s)

Chronic respiratory disease, focusing on chronic obstructive pulmonary disease (COPD)

Note: It was not possible to comprehensively cover all chronic respiratory diseases.

## Other Disease/Condition(s) Addressed

- Anxiety
- Asthma
- Cardiovascular disease
- Depression
- Idiopathic pulmonary fibrosis
- Interstitial lung disease
- Non-cystic fibrosis (CF) bronchiectasis

## Guideline Category

Counseling

Evaluation

Management

Rehabilitation

Risk Assessment

## Clinical Specialty

Family Practice

Internal Medicine

Nutrition

Physical Medicine and Rehabilitation

Pulmonary Medicine

## Intended Users

Advanced Practice Nurses

Dietitians

Health Care Providers

Nurses

Occupational Therapists

Physical Therapists

Physician Assistants

Physicians

Respiratory Care Practitioners

## Guideline Objective(s)

- To provide a UK evidence-based guideline for pulmonary rehabilitation in adult patients with chronic respiratory disease in an outpatient setting
- To inform those conducting pulmonary rehabilitation and also those who manage patients with chronic respiratory disease who may be referred into a rehabilitation scheme

## Target Population

Adults with chronic respiratory disease, focusing on chronic obstructive pulmonary disease (COPD)

Note: Children are not covered by this guideline.

## Interventions and Practices Considered

1. Pulmonary rehabilitation, including resistance training and aerobic training
2. Assessment of pulmonary rehabilitation effectiveness, including improvements in exercise capacity, dyspnoea, and health status
3. Referral process and criteria for pulmonary rehabilitation
4. Structure of pulmonary rehabilitation including supervision, nature of training (aerobic +/- resistance; interval and continuous), goal setting, duration, and rolling or cohort programmes
5. Post-exacerbation pulmonary rehabilitation
6. Potential role of adjuncts to pulmonary rehabilitation, including inspiratory muscle training, noninvasive ventilation, supplemental oxygen and heliox, nutritional supplements, and neuromuscular electrical stimulation
7. Pulmonary rehabilitation in people with other chronic respiratory diseases (e.g., non-cystic fibrosis [CF] bronchiectasis, interstitial lung disease [ILD], asthma)
8. Post pulmonary rehabilitation (e.g., repeat pulmonary rehabilitation, maintenance)

## Major Outcomes Considered

- Exercise capacity
- Dyspnoea and health status
- Physical activity
- Activities of daily living
- Muscle strength
- Nutritional status
- Self-efficacy
- Quality of life
- Symptoms and levels of anxiety and depression

## Methodology

### Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

Clinical Questions and Literature Search

Clinical questions were structured in the PICO (Patient, Intervention, Control, Outcome) format (see Web Appendix 1 of the original guideline document; see the "Availability of Companion Documents" field) to define the scope of the guideline and inform the literature search.



Systematic electronic database searches were conducted to identify potentially relevant studies for inclusion in the guideline. For each topic area, the following databases were searched: Ovid MEDLINE (including MEDLINE In Process), Ovid EMBASE, and the Cochrane Library (including the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effects) from 1980.

The searches were first run in August 2011 and updated in September 2012 (see Web Appendix 2 of the original guideline document; see the "Availability of Companion Documents" field). Searches included a combination of indexed terms and free text terms and were limited to English language publications only. The initial search identified 2087 potential abstracts and the second search 173.

## Appraisal of Literature

Appraisal was performed to be compliant with the Appraisal of Guidelines for Research and Evaluation (AGREE) collaboration. Four individuals read the title and abstract of each article retrieved by the literature searches and decided whether the paper was definitely relevant, possibly relevant, or not relevant to the project. Criteria formulated for categorising the abstracts into these 3 groups were:

- Whether the study addressed the clinical question
- Whether the appropriate study type was used to produce the best evidence to answer the clinical question
- Review articles were excluded.
- Abstract was in English
- Abstracts were not rejected on the basis of the journal of publication, country in which the research was performed or published, or the date of publication.

The full paper was obtained for all relevant or possibly relevant abstracts and allocated to the relevant section(s) of the guideline. The first screening process identified 472 of the initial 2087 reference abstracts to be definitely or possibly relevant to the guideline. The second literature search in September 2012 yielded 173 reference abstracts. Of these, 50 were identified as definitely or possibly relevant to the guideline. However, all of the pertinent ones from this search had been identified by the Guideline Development Group in the meantime and already incorporated.

## Number of Source Documents

The first screening process identified 472 of the initial 2087 reference abstracts to be definitely or possibly relevant to the guideline. The second literature search in September 2012 yielded 173 reference abstracts. Of these, 50 were identified as definitely or possibly relevant to the guideline.

## Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

## Rating Scheme for the Strength of the Evidence

Key to Evidence Statements

Grade	Evidence
1++	High-quality meta-analyses, systematic reviews of randomised controlled trials (RCTs) or RCTs with a very low risk of bias
1+	Well conducted meta-analyses, systematic reviews of RCTs or RCTs with a low risk of bias
1-	Meta-analyses, systematic reviews or RCTs or RCTs with a high risk of bias
2++	High-quality systematic reviews of case-control or cohort studies or high-quality case-control or cohort studies with a very low risk of confounding, bias or chance, and a high probability that the relationship is causal
2+	Well conducted case-control or cohort studies with a low risk of confounding, bias or chance, and a moderate probability that the relationship is causal
2-	Case-control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal
3	Non-analytic studies, for example, case reports, case series

4	Grade	Expert opinion
	Evidence	

## Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

## Description of the Methods Used to Analyze the Evidence

Appraisal of Literature

Two guideline reviewers per section independently reviewed the abstracts to identify papers to be appraised for the guideline (see Appendix A of the original guideline document). The 2 reviewers for each section then independently appraised each paper assigned to them using the Scottish Intercollegiate Guidelines Network (SIGN) critical appraisal checklists. The reliability of the evidence in each individual study was graded using the SIGN critical appraisal checklists and is shown in the evidence tables (++ , + , or –). The body of evidence for each recommendation was summarised into evidence statements and graded using the SIGN grading system (see the "Rating Scheme for the Strength of the Evidence" field). Disagreements were resolved by discussion with the section partner.

Considered Judgement and Grading of Evidence

The Guideline Development Group used the evidence tables to judge the body of evidence and grade recommendations for this guideline. Evidence tables, found in Web Appendices 3 and 4, are available online (see the "Availability of Companion Documents" field). When evidence was lacking to answer the formulated clinical questions, expert opinions were obtained through consensus.

## Methods Used to Formulate the Recommendations

Expert Consensus

## Description of Methods Used to Formulate the Recommendations

This guideline is based on the best available evidence. The methodology used to write the guideline adheres strictly to the criteria as set by the Appraisal of Guidelines for Research and Evaluation (AGREE) collaboration, which is available online at <http://www.agreetrust.org/resource-centre/agree-ii/> . The British Thoracic Society (BTS) Standards of Care Committee (SOCC) guideline production manual is available at [www.brit-thoracic.org.uk/guidelines.aspx](http://www.brit-thoracic.org.uk/guidelines.aspx) .

Drafting the Guideline

The Guideline Development Group corresponded regularly by email and meetings of the full group were held in March and June 2011, January, March, May, and September 2012. A lay summary was written (see Appendix D in the original guideline document; see the "Availability of Companion Documents" field).

Considered Judgement and Grading of Evidence

The Guideline Development Group used the evidence tables to judge the body of evidence and grade recommendations for this guideline. Evidence tables, found in Web Appendices 3 and 4, are available online (see the "Availability of Companion Documents" field). When evidence was lacking to answer the formulated clinical questions, expert opinions were obtained through consensus.

The following were considered in grading the recommendations:

- The available volume of the body of evidence
- How applicable the obtained evidence was in making recommendations for the defined target audience of this guideline
- Whether the evidence was generalisable to the target population for the guideline
- Whether there was a clear consistency in the evidence obtained to support recommendations
- What the implications of recommendations would be on clinical practice in terms of resources and skilled expertise

- Cost effectiveness was not reviewed in detail as in-depth economic analysis of recommendations falls beyond the scope of this guideline.

Recommendations were graded from A to D as indicated by the strength of the evidence, as shown in the "Rating Scheme for the Strength of the Evidence" field. In line with Scottish Intercollegiate Guidelines Network (SIGN) guidance, 'minus' evidence was considered in context, but in the absence of other 'plus' supporting evidence, it was discussed among the Guideline Development Group regarding that point and any recommendation made was grade D. Important practical points lacking any research evidence, and not likely to be research evidence, were highlighted as 'good practice points' (GPP).

## Rating Scheme for the Strength of the Recommendations

### Grades of Recommendations

Grade	Type of Evidence
A	At least one meta-analysis, systematic review, or randomised controlled trial (RCT) rated as 1++ and directly applicable to the target population <i>or</i>  A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+ directly applicable to the target
B	A body of evidence including studies rated as 2++ directly applicable to the target population and demonstrating overall consistency of results <i>or</i>  Extrapolated evidence from studies rated as 1++ or 1+
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D	Evidence level 3 or 4 <i>or</i>  Extrapolated evidence from studies rated as 2+
GPP (Good Practice Point)	Important practical points for which there is no research evidence, nor is there likely to be any research evidence. The Guideline Committee wishes to emphasise these as Good Practice Points

## Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

## Method of Guideline Validation

External Peer Review

Internal Peer Review

## Description of Method of Guideline Validation

The British Thoracic Society (BTS) Standards of Care Committee (SOCC) reviewed the draft guideline in November 2012. The draft guideline was presented and discussed at the Winter BTS meeting in December 2012 and a draft was subsequently available online in December 2012/January 2013 for public consultation. A draft guideline document was circulated to all the relevant stakeholders for consultation in December

2012/January 2013 (see Appendix B in the original guideline document). The BTS SOCC re-reviewed the revised draft guideline in March 2013 and final SOCC approval was granted in April 2013.

## Evidence Supporting the Recommendations

### Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Appropriate management of pulmonary rehabilitation in adults

### Potential Harms

Profound desaturation on exercise has the potential to lead to end-organ impairment and compromise the benefits of exercise. Until further evidence is available, the level of exercise-induced hypoxia that is acceptable will depend on clinical judgement in individual cases, and practitioners will have their own thresholds that will prompt further investigation for occult comorbidity or perhaps influence decisions on the nature of the programme instituted. These decisions may be more difficult in patients with lung fibrosis who tend to desaturate more readily on exercise but often with lesser symptomatic awareness. No trials reported adverse events related to oxygen toxicity.

## Contraindications

### Contraindications

- From a safety perspective it is logical that patients with unstable cardiovascular disease (e.g., unstable angina, unstable arrhythmias) should not enter a rehabilitation programme until stabilised.
- Patients with unstable cardiac disease or locomotor difficulties that preclude exercise (e.g., severe arthritis or severe peripheral vascular disease) should not be referred for pulmonary rehabilitation.

## Qualifying Statements

### Qualifying Statements

Healthcare providers need to use clinical judgement, knowledge and expertise when deciding whether it is appropriate to apply recommendations for the management of patients. The recommendations cited here are a guide and may not be appropriate for use in all situations. The guidance provided does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each patient, in consultation with the patient and/or their guardian or carer.

## Implementation of the Guideline

### Description of Implementation Strategy

An implementation strategy was not provided.

## Implementation Tools

Patient Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

## Institute of Medicine (IOM) National Healthcare Quality Report Categories

### IOM Care Need

Getting Better

Living with Illness

### IOM Domain

Effectiveness

Patient-centeredness

## Identifying Information and Availability

### Bibliographic Source(s)

Bolton CE, Bevan-Smith EF, Blakey JD, Crowe P, Elkin SL, Garrod R, Greening NJ, Heslop K, Hull JH, Man WD, Morgan MD, Proud D, Roberts CM, Sewell L, Singh SJ, Walker PP, Walmsley S, British Thoracic Society Pulmonary Rehabilitation Guideline Development Group, British Thoracic Society Standards of Care Committee. British Thoracic Society guideline on pulmonary rehabilitation in adults. *Thorax*. 2013 Sep;68(Suppl 2):ii1-30. [211 references] [PubMed](#)

### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

2013 Sep

### Guideline Developer(s)

British Thoracic Society - Medical Specialty Society

### Source(s) of Funding

The meeting room, travel expenses, literature search and associated administration costs were funded by the British Thoracic Society.

## Guideline Committee

British Thoracic Society (BTS) Pulmonary Rehabilitation Guideline Development Group

## Composition of Group That Authored the Guideline

*Guideline Development Group Members:* Charlotte E Bolton, Nottingham Respiratory Research Unit, University of Nottingham, City Hospital campus, Nottingham, UK; Elaine F Bevan-Smith, Department of Pulmonary Rehabilitation, Worcestershire Royal Hospital, Worcester, UK; John D Blakey, Respiratory Medicine, University Hospital Aintree, Liverpool, UK; Patrick Crowe, Patient representative, Mansfield, UK; Sarah L Elkin, Department of Respiratory Infection and Medicine, Imperial College Healthcare NHS Trust, London, UK; Rachel Garrod, Pulmonary Rehabilitation Department, Kings College NHS Foundation Trust, London, UK; Neil J Greening, Department of Respiratory Medicine, University Hospitals of Leicester, Leicester, UK; Karen Heslop, Respiratory Medicine, Royal Victoria Infirmary, Newcastle, UK; James H Hull, Department of Respiratory Medicine, Royal Brompton Hospital, London, UK; William D-C Man, Department of Respiratory Medicine, NIHR Biomedical Research Unit for Advanced Lung Disease, Harefield, UK; Michael D Morgan, Department of Respiratory Medicine, University Hospitals of Leicester, Leicester, UK; David Proud, Respiratory Medicine, University Hospital Llandough, Penarth, S Wales, UK; C Michael Roberts, Respiratory Medicine, Whipps Cross Hospital, London, UK; Louise Sewell, Department of Respiratory Medicine, University Hospitals of Leicester, Leicester, UK; Sally J Singh, Department of Cardiac/Pulmonary Rehabilitation, University Hospitals of Leicester NHS Trust, Leicester, UK; Paul P Walker, Respiratory Medicine, University Hospital Aintree, Liverpool, UK; Sandy Walmsley, Heart of England NHS Foundation Trust, Birmingham, UK

## Financial Disclosures/Conflicts of Interest

The Guideline Development Group members adhered to the British Thoracic Society (BTS) policy for the Declaration of Interests (available on the [BTS Web site](#)  or by contacting the BTS Head Office).

## Guideline Endorser(s)

Association of Chartered Physiotherapists in Respiratory Care - Professional Association

Association of Respiratory Nurse Specialists - Professional Association

College of Occupational Therapists (UK) - Professional Association

Primary Care Respiratory Society - UK - Medical Specialty Society

## Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

## Guideline Availability

Electronic copies: Available from the [British Thoracic Society Web site](#) .

## Availability of Companion Documents

The following is available:

- British Thoracic Society Standards of Care Committee guideline production manual. London (UK): British Thoracic Society; 2013 Jul 1. 32

p. Electronic copies: Available in Portable Document Format (PDF) from the [British Thoracic Society \(BTS\) Web site](#) .

The Web Appendices, containing methodology information including clinical questions, literature searches, and evidence tables, are available from the [BTS Web site](#) .

## Patient Resources

A lay summary of the guideline is available in Appendix D of the [original guideline document](#) .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

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